

### **AMENDMENTS TO THE DRAWINGS:**

The attached sheets of drawings include changes to Figs. 7, 9, and 11.

A drawing sheet which includes only Fig. 7, replaces the original sheet which included only Fig.

7. In Fig. 7, an extraneous line has been removed.

A drawing sheet which includes only Fig. 9, replaces the original sheet which included only Fig.

9. In Fig. 9, previously transposed reference numbers 123 and 124 have been corrected, so that reference number 123 indicates a passage and reference number 124 indicates a fin. This correction permits Fig. 9 to be consistent with the written description.

A drawing sheet which includes only Fig. 11 replaces the original sheet which included only Fig.

11. In Fig. 11, the figure label "PRIOR ART" has been added.

Attachment: Replacement Sheets

Annotated Sheets

## REMARKS

Upon entry of the present Amendment-A the claims in the application are claims 1-23, of which claims 1 and 14 are independent. Claims 1, 5, and 14 have been amended, claims 2-4, 6-12, and 15-19 have been canceled, and new claims 20-23 have been added to the application by the present amendment.

The applicant's representative thanks the Examiner for his helpful remarks during a telephone discussion which took place on November 2, 2005. During the discussion, proposed amendments to the claims were discussed with respect to the cited prior art references Carhart, Bullard, Alas, and Kummer, with emphasis on Carhart and Bullard. The Examiner noted that Carhart shows both openings and fins on the clutch outer member and the pressure plate, although the fan arrangement is reversed from that disclosed by the applicant. With respect to proposed claims which included recitations of the clutch mounted on a second shaft so as to be displaced from the crankshaft, the Examiner noted that such configuration is disclosed in the prior art. With respect to proposed claims which included specific recitations of shape and orientation of fins and openings on the respective clutch members, the Examiner considered a combination of the proposed new claims 20 and 22 to include subject matter which is initially considered favorably, but would require further search before a final determination of patentability is made. Thus, no agreement was reached in the telephone discussion.

The above-identified Office Action has been reviewed, the references carefully considered, and the Examiner's comments carefully weighed. In view thereof, the present Amendment is submitted. Applicant respectfully submits that all of the above amendments are fully supported by the original application. Applicant also respectfully submits that the above

amendments do not introduce any new matter into the application. It is contended that by the present amendment, all bases of rejection set forth in the Office Action have been traversed and overcome. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

#### **IN THE SPECIFICATION**

The specification is amended herein to correct minor errors, including typographical and grammatical errors. No new matter is added by amendments to the specification.

#### **IN THE CLAIMS**

##### **Claim rejections -- 35 USC 112**

The Examiner has rejected claims 4, 10-12, 17 and 19 under 35 USC 112, second paragraph, as being indefinite. The applicant has canceled these claims, whereby the rejections under 35 USC 112, second paragraph are obviated.

##### **Claim rejections -- 35 USC 102**

The Examiner has rejected claims 1-9 and 14-18 under 35 USC 102(b) as anticipated by Carhart (US 1,742,804). In the rejection, the Examiner states that Carhart discloses a dry multi-disc clutch with a plurality of friction discs 15, 16 interposed between a drive side clutch outer 1 and a driven side clutch center 2 engaged by a pressure plate 23, 24, with fins 22 formed on the clutch outer, fins 26 formed on the pressure plate, passage 20 formed in the clutch outer, and passage 25 formed in the pressure plate. The Examiner states that the clutch of Carhart is for use in a vehicle and is disposed outside the engine of the crankcase.

### Applicant's Response

The applicant agrees that, as broadly claimed, the disclosure of Carhart anticipates the applicant's claimed invention. However, the applicant disagrees that the disclosure of Carhart anticipates the invention disclosed, but not claimed, by the applicant. Upon review of Carhart, the applicant finds that Carhart discloses an automotive-type clutch, wherein the clutch is formed on a shaft in cooperative engagement with a flywheel 3. In particular, the clutch outer drum 1 is generally cup-shaped in which the bottom portion 5 is fixed to the flywheel and extends perpendicularly to the shaft 7. The side wall portion of the clutch outer drum 1 extends in parallel to the shaft 7. The clutch outer drum 1 includes a passage 20 formed in the side wall portion so that air flows through the passage 20 in a direction radial to the shaft 7, that is, centrifugally. The fin 22 is also disposed on the side wall portion of the clutch outer drum 1, and extends radially outward from an outer side of the clutch outer drum side wall. Carhart discloses a pressure plate disposed adjacent friction disks 15, 16 at an outside of the clutch outer drum 1. The pressure plate 23 is urged inward toward the bottom portion 5 of the clutch outer 1 by means of linear coil springs 30 (p.2, lines 72-78), and the pressure plate 23 includes passages 25 disposed at intervals thereon and which are provided with a fin or vane 26 along one side. The passage 25 is elongate and is oriented to extend linearly in a radial direction on the face of the pressure plate 23 so that air flows through passage 25 in an axial direction.

The clutch structure disclosed by the applicant is quite distinct from that disclosed by Carhart. In particular, the applicant's clutch 70 is not mounted on a crankshaft in association with a flywheel, but instead is disposed on a transmission shaft which lies in parallel to the crankshaft. The applicant's clutch 70 includes a clutch outer member 85 which is generally cup

shaped, and is provided with openings 113 and fins 114 formed in the bottom portion 116 rather than the side wall portion 111 of the outer member. As seen in the applicant's Fig. 8, the plural openings 113 in the clutch outer member 85 extend radially, and the fins 114 are disposed between adjacent openings 113. Moreover, the openings are inclined with respect to the bottom portion, or in the axial direction of the clutch, as indicated by the broken lines in Fig. 8. Thus, air flows through the opening 113 in a generally axial direction, and in a direction at a slight angle thereto due to the inclination of the openings 113. The configuration of the openings 113 and fins 114 act to provide an axial fan within the clutch 70.

The applicant's clutch further includes a pressure plate 89 formed in the shape of a flat annular ring lying generally in parallel with the bottom portion 116 of the outer member 85. The pressure plate 89 is biased toward the bottom portion 116 of the outer member 85 by means of a diaphragm spring 92 disposed at the inner periphery of the pressure plate 89. The pressure plate 89 includes axially protruding fins 124 which extend generally from the inner peripheral edge of the ring to the outer peripheral edge of the ring. Fins 124 have an arcuate shape which provides corresponding arcuate passages 123 therebetween. Thus, air flows through the opening passages 123 in a generally radially outward direction along an arcuate path. The configuration of the passages 123 and fins 124 act to provide a centrifugal fan within the clutch 70.

Because the clutch structure disclosed by the applicant is patentably distinct from that disclosed by Carhart, the applicant has amended independent claims 1 and 14 to more clearly recite the structure of the applicant's invention.

In particular, claim 1 now recites fins that enhance a flow of air are formed on both of the clutch outer member and the pressure plate, and plural passages which allow the communication

of air are formed in both the clutch outer member and the pressure plate, such that the clutch outer member is configured to act as an axial fan, and the pressure plate is configured to act as a centrifugal fan. Claim 1 also recites that a portion of the clutch outer member forming the axial fan and a portion of the pressure plate forming the centrifugal fan are substantially parallel, and that the plurality of friction discs are disposed between the centrifugal fan and the axial fan. This configuration is not disclosed by Carhart, who discloses a clutch in which the outer member acts as centrifugal fan, and the pressure plate (backplate 23) acts as an axial fan. This fan arrangement is opposite that claimed by the applicant. In addition, Carhart discloses a centrifugal fan which is oriented in a direction perpendicular to that of the axial fan, rather than the parallel arrangement now claimed by the applicant.

Moreover, the applicant submits that it would not be an obvious modification of Carhart to transpose the fan arrangement of Carhart, because such a modification is not compatible with the basic structure of Carhart. In particular, since the clutch outer member of Carhart is fixed to a flywheel 3, which forms a closed wall in the axial direction, the flywheel would prevent any significant axial airflow through an axial passageway and fin structure provided on the clutch outer member of Carhart. Moreover, formation of a centrifugal fan structure on the pressure plate (backplate 23) of Carhart would add minimal cooling advantage since the backplate 23 is generally bowl shaped, and only the rim portion of the bowl contacts the heat generating portions (disks 15, 16) of the clutch. Thus movement of air radially outward, across the bottom portion of the bowl would provide little cooling benefit to the heat generating portions (disks 15, 16), which would be spaced apart cooling fins and passageways formed on the backplate. Applicant therefore requests reconsideration and withdrawal of the Examiner's rejection of claims 1, 5, and

14 under 35 USC 102(b) as anticipated by Carhart.

The applicant has also amended independent claim 14 herein to more clearly claim the disclosed invention. In particular, claim 14 now recites in detail the axial fan structure of the clutch outer member, the centrifugal fan structure of the pressure plate, and also recites that the pressure plate further comprises a diaphragm spring disposed at its inner periphery which urges the pressure plate toward the clutch outer member. This combination features is not suggested or disclosed by Carhart, whose base flange 5 of the clutch outer member 1 is too narrow to include an axial fan structure at this location, and since any axial airflow at this location is prevented by the presence of the flywheel 3. Moreover, Carhart does not disclose or suggest employment of a diaphragm spring disposed at the inner periphery of the pressure plate used to bias the pressure plate toward the clutch outer member.

The Examiner has rejected claims 1, 2, 5, 6, 8, 10, 14, 15, and 18 under 35 USC 102(b) as anticipated by Bullard, Jr. et al. (US 1,601, 235). Applicant respectfully disagrees with this ground of rejection, and requests reconsideration and withdrawal thereof.

In the Office, Action, the Examiner states that Bullard discloses a dry clutch including a driven clutch plate 10 having a plurality of friction disks 28 interposed between a drive side clutch outer 16 and a driven side clutch center 14, and that fins 32 are provided on the clutch outer. A passage 31 is provided on the clutch outer and a central passage is provided on the pressure plate 25. The Examiner further states that the clutch and pressure plate of Bullard et al are disposed outside a crankcase of the vehicle engine, and fins 32 provide an axial fan.

#### Applicant's Response

Upon review of Bullard, the applicant notes that Bullard discloses an automotive-type single disc (pg. 2, line 130) clutch, wherein the clutch is formed in cooperative engagement with a flywheel 1. In particular, the clutch outer housing 16 is generally cup-shaped in which the sidewall portion is connected to the flywheel, and a bottom portion extends perpendicularly to a clutch shaft 4. The clutch outer housing includes passages 31 formed in the bottom portion so that air flows through the passage 31 in a direction parallel to the shaft 4, that is, axially. An inclined blade 32 is formed at the rear radially extending edge of the passage 31. The clutch outer housing 16 further includes plural passages 30 disposed at intervals along the sidewall portion thereof. The passages 30 are oriented to extend in a radial direction, permitting centrifugal airflow outward therefrom. Bullard discloses a pressure plate 25 disposed adjacent friction rings 28 at an interior location of the clutch outer housing such that the friction rings reside between the pressure plate 25 and the flywheel 1, and such that a spring force urges the pressure plate 25 away from the interior of clutch outer housing 16 and toward the flywheel 1.

The applicant disagrees with this rejection since Bullard does not disclose each and every feature claimed by the applicant. In particular, the pressure plate 25 of Bullard does not include air passages formed therein. The pressure plate of Bullard is annular in shape and thus does include a single central opening, however, the applicant does not agree that such a single central opening corresponds to “passages [plural]...are formed ... in the pressure plate”, as claimed by the applicant. In other words, the pressure plate of Bullard is a flat ring (p. 2, line 96), the body itself of which has no air passages. The applicant submits that the central opening is not part of the ring, but is a merely vacancy surrounded by the ring. .

In addition, although Bullard suggests a multiple disc clutch, the illustrated clutch is a



single disc clutch, and therefore, the disclosure does not anticipate the applicant's claimed invention which recites "a plurality" of discs. The applicant concedes, however, that if the claims were rejected under an obviousness-type rejection, modification of Bullard to a multiple disc clutch would be obvious in view of the explicit suggestion of the multiple disc clutch therein (page 2, lines 125-130).

The applicant respectfully submits that the amendments to independent claims 1 and 14 herein further distinguish the applicant's invention from that disclosed by Bullard. In particular, claim 1 now recites fins that enhance a flow of air are formed on both of the clutch outer member and the pressure plate, and plural passages which allow the communication of air are formed in both the clutch outer member and the pressure plate, such that the clutch outer member is configured to act as an axial fan, and the pressure plate is configured to act as a centrifugal fan. Claim 1 also recites that a portion of the clutch outer member forming the axial fan and a portion of the pressure plate forming the centrifugal fan are substantially parallel, and that the plurality of friction discs are disposed between the centrifugal fan and the axial fan.. This feature is not disclosed by Bullard, in which only the clutch outer member comprises air passageways and fins. In addition, in Bullard, the friction discs are disposed to one side of both the pressure plate and the clutch outer member, rather than between these two members.

Claim 14 has been amended to recite the particular structure of the fins and air passageways on each of the clutch outer member and the pressure plate, and also recites that the pressure plate further comprises a diaphragm spring disposed at its inner periphery which urges the pressure plate toward the clutch outer member. These features are not disclosed by Bullard, who discloses plural leaf springs 70 disposed about the circumference of the pressure plate,

between the pressure plate and the clutch outer member so as to urge the pressure plate in a direction away from the clutch outer member.

Applicant therefore requests reconsideration and withdrawal of the Examiner's rejection of claims 1, 5, and 14 under 35 USC 102(b) as anticipated by Bullard.

### **Claim rejections -- 35 USC 103**

The Examiner has rejected claims 3, 4, 7, 9, 11, 12, 16, 17, and 19 under 35 USC 103(a) as being unpatentable over Bullard in view of either Alas (US 4,529,074) or Kummer et al (US 6,129,191). In his rejection, the Examiner states that Bullard discloses an axial fan provided by fins 32 on the clutch outer, but does not disclose fins on the pressure plate. The Examiner further states that Alas and Kummer both disclose clutches wherein fins are disposed on the pressure plate providing centrifugal fans, and that it would have been obvious to provide fins on the pressure plate in addition to those on the clutch outer to enhance the flow of cooling air.

### **Applicant's Response**

The rejected claims 3, 4, 7, 9, 11, 12, 16, 17, and 19 have been canceled herein, obviating the Examiner's rejection. However, for the purpose of promoting the prosecution of the applicant's claims as amended herein, the applicant submits that it would not been obvious to modify Bullard to provide fins on the pressure plate shown by Alas and Kummer.

The applicant agrees that Alas and Kummer disclose fins on the pressure plates of the respective disclosed clutches. However, modification of Bullard to include the thin, elongate curved fins 24 of Alas or the short, linear, elliptical fins of Kummer is not obvious since there is there is not adequate space in the existing structures of Bullard to permit such a modification. In

particular, there is not adequate space between the pressure plate 25 and the releasing levers 35 and /or the plate springs 70, for disposal of such fins and passageways thereon and/or for proper function (ie, adequate direction of airflow in a radial direction) of such fins and passageways. Moreover, since the releasing levers 35 are mounted via plural pairs of lugs 26 formed on the outer surface of the pressure plate, and the plate springs 70, mounted via spring seats 25, extend circumferentially across the outer surface thereof, and since other structures such as a reinforcing rib 85 and plural sockets 86 are formed on this outer surface of the pressure plate, available space on the outer surface of the pressure plate 25 is further limited.

In addition, the applicant submits that although Alas discloses fins 24 mounted on a pressure plate, Alas teaches away from employment of such fins without the use of a confinement member through which the elastic means are axially operative on the pressure plate, since use of such fins on a pressure plate “are known to interfere with the axial operation of the elastic member” (coil springs or diaphragm springs) (col. 2, line 66-col. 3, line 23).

Moreover, the applicant submits that Kummer provides reinforcing ribs on the outer surface of the pressure plate along the inner peripheral edge thereof. However, the applicant submits that Kummer is able to do so as a specific result of the presence of the adjustment mechanism 42 provided on the pressure plate since the adjustment mechanism 4 is positioned between the pressure plate and the elastic member 32. Thus, for the reasons described herein, the applicant disagrees that it would be obvious to modify Bullard to include fins on the pressure plate as taught by Alas and Kummer.

The Examiner has rejected claim 13 under 35 USC 103(a) as being unpatentable over

Carhart in view of Iiyama et al (JP 5-106642). The Examiner states that Carhart does not specify a type of vehicle for which the clutch is provided, but that Iiyama discloses a dry multi-disc clutch for use in a motorcycle that includes fins 14 to enhance the flow of air, and thus it would have been obvious to provide the air flow-enhancing features of Carhart in the clutch of Iiyama to provide cooling thereto.

#### Applicant's Response

The applicant respectfully disagrees with this rejection for the reasons stated above with respect to the rejection of claim 1, from which claim 13 depends. Modification of Carhart by the teachings of Iiyama do not cure the deficiencies of the rejection of claim 1.

In addition, the applicant respectfully disagrees with this rejection since it would not have been obvious to provide the features of Carhart in the clutch of Iiyama. In particular, although it is not explicitly stated in the disclosure of Carhart, the general arrangement of the clutch mounted to a flywheel is a well known configuration commonly associated with automotive applications. The "air flow enhancing features" of Carhart are based on a configuration which includes such a flywheel, since the clutch outer member is attached to the fly wheel and the opening 20 and fins 22 act cooperatively with the surfaces of the flywheel to generate air flow and flow pathways. The applicant submits that it would not be obvious to include the automotive type clutch system of Carhart in the motorcycle clutch system of Iiyama because inclusion of such a flywheel in the motorcycle of Iiyama would introduce unnecessary weight and complication of the cooling system of Iiyama.

Moreover, the applicant submits the close spacing between the clutch outer member and the clutch cover of Iiyama precludes formation of fins on the outer surface of the clutch outer

member as taught by Carhart.

The applicant therefore requests reconsideration and withdrawal of the Examiner's rejection of claim 13 under 35 USC 103(a) as unpatentable over Carhart in view of Iiyama.

#### **Other Matters**

New dependent claims 20-23 are added herein. New claim 20 depends from claim 14 and is directed to the axial offset of the openings formed in the clutch outer member. New claims 21-23 depend from directly or indirectly from claim 1, and add limitations directed to the specific description of the fin and air passage structure of both the clutch outer member and the pressure plate. The claimed structures are fully supported in the specification and particularly in drawing Figures 7, 8 and 9, and are not suggested or disclosed in the cited prior art references.

#### **Conclusion**

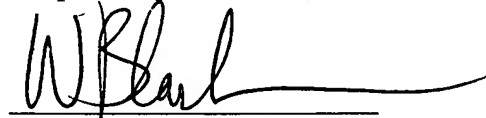
Based on all of the foregoing, applicant respectfully submits that all of the objections and rejections set forth in the Office Action are overcome, and that as presently amended, all of the pending claims are believed to be allowable over all of the references of record, whether considered singly or in combination. Applicant requests reconsideration and withdrawal of the rejection of record, and allowance of the pending claims.

If the Examiner is not fully convinced of all of the claims now in the application, applicant respectfully requests that the Examiner telephonically contact applicant's undersigned representative to expeditiously resolve prosecution of the application.

Favorable consideration is respectfully requested.

Customer No. 21828  
Carrier, Blackman & Associates, P.C.  
24101 Novi Road, Suite 100  
Novi, Michigan 48375  
December 13, 2005

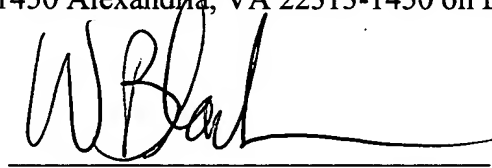
Respectfully submitted,



William Blackman  
Attorney for Applicant  
Registration No. 32,397  
(248) 344-4422

CERTIFICATE OF MAILING

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Fig. 7

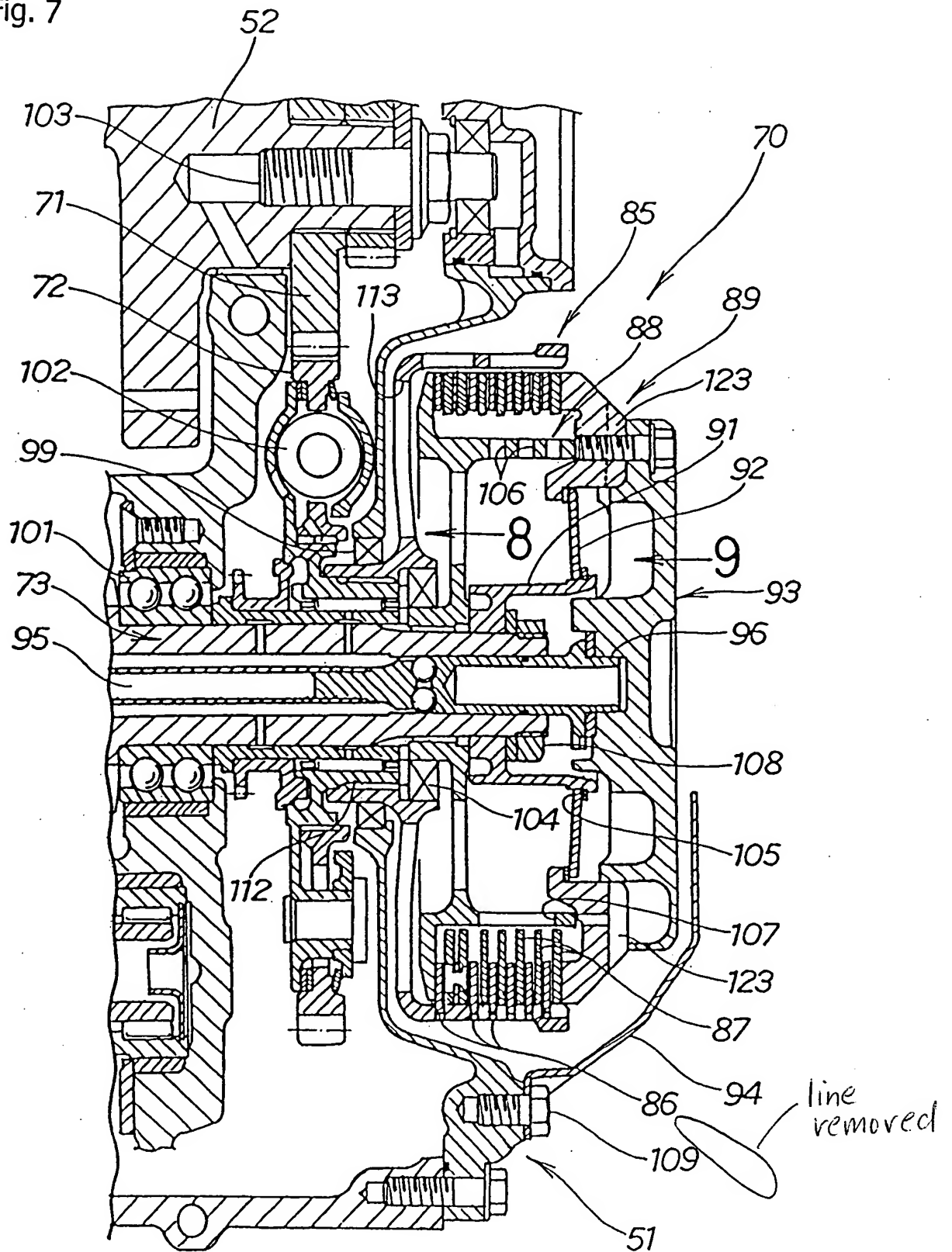
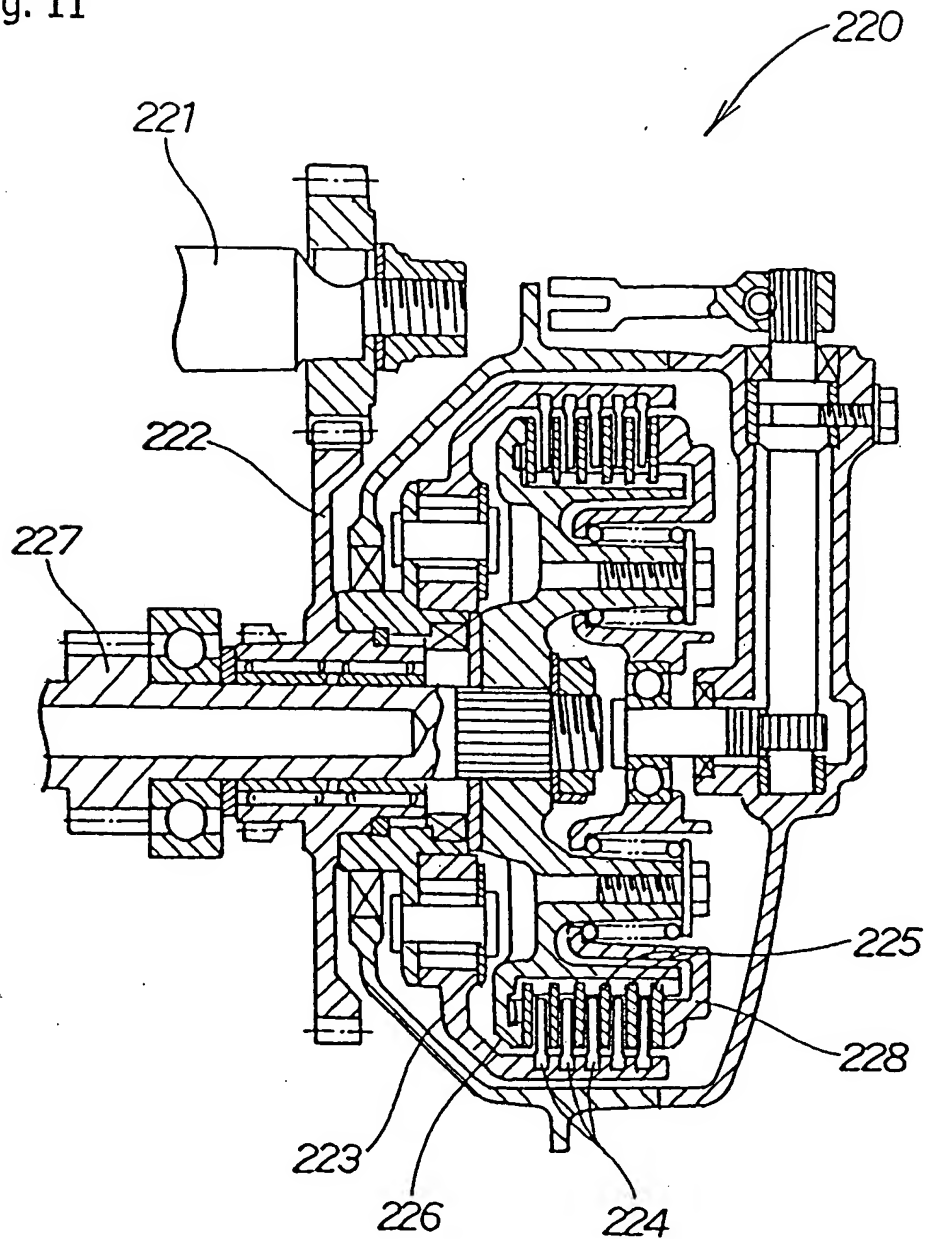


Fig. 9





Fig. 11



PRIOR ART

*Previously omitted label is added.*